Assessing the Psychometric Properties of Dream Content Questionnaires

by

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Abstract

The present study was the first of its kind to systematically explore the psychometric properties of dream content questionnaires as measures of dream experience. One hundred and six University students filled out the Dream Content Questionnaire (DCQ) and kept a 14-day dream diary on two separate occasions, in addition to filling out the NEO-PI-R and Multidimensional Personality Questionnaire and measures of spatial ability and imaginativeness. The DCQ's reliability was acceptable, as was its discriminant and construct validity. Six of eight predicted relationships between trait personality and DCQ reported dream content were significant. In contrast, dream diaries showed instability over time and were unrelated to personality traits. The DCQ's concurrent validity could not be adequately appraised due to the inconsistency in dream diary content over time. The results suggest that questionnaires may be used to measure dream experience; however, the precise utility of dream questionnaires remains unclear. The findings raise important questions concerning measures of dream experience.

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Table of Contents

I. Introduction	Page 7
II. Method	Page 18
A. Participants	Page 18
B. Measures	Page 19
C. Dream Scoring	Page 22
D. Procedure	Page 23
III. Results	Page 25
A. Sample Characteristics	Page 25
B. Scale Construction	Page 28
C. Interjudge Reliability	Page 29
D. Test-Retest Reliability	Page 34
E. Concurrent Validity	Page 38
F. Construct Validity	Page 41
G. Discriminant Validity	Page 46
E. Post Hoc Analyses	Page 47
IV. Discussion	Page 48
A. Reliability of the DCQ and Diaries	Page 50
B. Concurrent Validity of the DCQ	Page 53
C. Construct Validity of the DCQ	Page 56
D. Discriminant Validity of the DCQ	Page 61

Table of Contents (contd.)

E. How to Account for Problems with the DCQ's Psychometric Properties Page 62

V. Conclusion Page 64

VI. References Page 66

VII. Appendices Page 73

Tables and Appendices

1. Table 1 --- Primary Predictions for Construct Validity
2. Table 2 --- DCQ Response Frequencies in Three Independent Samples
3. Table 3 --- Inter-Rater Reliability
4. Table 4 --- Test-Retest Reliability of the DCQ and Diaries
5. Table 5 --- Concurrent Validity for Sessions 1 and 2
6. Table 6 --- Construct Validity of the DCQ
7. Appendix 1 --- Dream Content Questionnaire (DCQ)
8. Appendix 2 --- Abbreviated Tellegen Absorption Measure
9. Appendix 3 --- Scoring Manual for Dream Diaries

Assessing the Psychometric Properties of Dream Content Questionnaires

Dream questionnaires have been used widely in dream research (e.g., Brown & Donderi, 1986; Verdone, 1965). Some studies have even used questionnaires as the sole measure of dream experience (e.g., Bernstein & Roberts, 1995; Lang & O'Connor, 1984; Spanos, Stam, Radtke-Bodorik & Nightingale, 1980). There has never been a systematic investigation of the psychometric properties of such dream content questionnaires. This is unfortunate, given the potential utility of such tools versus the possibility that questionnaires may be inadequate measures of dream content. In addition to being cheaper and faster than collecting and scoring home diaries and laboratory reports, questionnaires also tap a different cognitive dimension. Dream diaries and laboratory reports are intended to be immediate assessments of sleep mentation, while questionnaires serve to measure patterns of retrospectively recalled dream content. The present study is the third in a series of investigations conducted by the author to assess the reliability and validity of dream content questionnaires (Bernstein & Roberts, 1995; Bernstein, 1994).

Dream content questionnaires generally fall into one of two categories. They are either administered to subjects daily upon awakening in the laboratory or at home, or they are given once as a general assessment of retrospective dream experience. The former is typically used in conjunction with verbal and/or written dream reports. These questionnaires ask subjects to answer items

pertaining to the last mental events recalled from the previous night (e.g., Verdone, 1965). The second type of dream content questionnaire attempts to measure an individual's typical dream experience by asking questions pertaining to one's overall dream life (e.g., DeMartino, 1953).

Using this latter approach, we previously demonstrated that dream content questionnaires may be adequate measures of dream experience (Bernstein & Roberts, 1992, 1995; Bernstein, 1994). We tested this hypothesis by developing a Dream Content Questionnaire (DCQ) based on Hall and Van De Castle's (1966) well documented dream content scales. In our first investigation (Bernstein & Roberts, 1995), we compared college students' responses on the DCQ to the norms obtained by Hall and Van De Castle (1966). We found some similarities between these two different measures. Three years later, Bernstein (1994) conducted a second investigation on a different sample of college students, again using the DCQ to assess dream content. Findings, and especially the DCQ response frequencies, were very similar to those found three years prior.

One general criticism of our previous work is that we did not collect dream diaries. The present investigation sought to remedy this problem. I used a revised version of the DCQ designed to assess the reliability and validity of retrospective dream experience. The DCQ's test-retest reliability was assessed by administering the questionnaire on two separate occasions three months apart. I also collected 14-day dream diaries during these two periods, in addition to administering two standard personality inventories and measures of spatial ability and

imaginativeness. I measured the DCQ's internal consistency by constructing scales from the DCQ's individual items that matched the empirical scales developed by Hall and Van De Castle (1966). Finally, the DCQ's validity was assessed as follows: concurrent validity was measured by comparing the DCQ responses to the corresponding content scales and items in the dream diaries; construct validity was assessed by comparing dream content on the DCQ and in the diaries to various personality traits as measured by the NEO-PI-R and the Multidimensional Personality Questionnaire; discriminant validity was measured by relating DCQ and dream diary content to trait absorption.

Concurrent Validity

Home dream diaries were selected for testing concurrent validity because it has been well documented that laboratory dream content contains an inordinate number of references to the laboratory setting (Domhoff & Kamiya, 1964). Because I was interested in what people typically dream and not in what they dream about the laboratory setting, home diaries were used in the present investigation. Also, it has been argued that home dream diaries may be the best means of studying the relationship between personality and dream content (Cann and Donderi, 1986; see Construct Validity section below). Dream diaries have been shown to produce reliable and stable findings over time and over different cultural epochs (Hall & Van De Castle, 1966; Hall, Domhoff, Blick & Weesner, 1982; Tonay, 1990-91). As was stated previously, home dream diaries are largely an immediate measure of sleep mentation in that they are quickly recorded after

awakening and involve little judgment on the dreamer's part. Dream diaries, and most verbal protocols, though, can be difficult to score, often making inter-rater agreement onerous. Conversely, a retrospective self-report questionnaire is almost entirely a cognitive tool without the pitfalls surrounding reliability issues like inter-rater agreement and validity issues like verbal ability. Unavoidably, retrospective questionnaires possess their own set of disadvantages. For instance, they may be highly sensitive to one's self-concept. We have argued earlier that the way in which people respond to a dream content questionnaire like the DCQ may be a function of how they view themselves (Bernstein & Roberts, 1995).

Construct Validity

There is strong evidence suggesting that dreams are continuous with waking preoccupations and concerns (i.e., the continuity hypothesis, Hall and Nordby, 1972). There is also evidence supporting a compensatory function of dreaming whereby dreams maintain and protect psychological balance (e.g., Samson & De Koninck, 1986). These two theories are by no means mutually exclusive (despite many an attempt to dichotomize them, e.g., Samson & De Koninck, 1986), because dreams may be continuous with waking life and still serve an adaptive function. Although the continuity hypothesis is generally accepted among dream researchers, to date, nobody has managed to clearly delineate the relationship between dream content and trait personality. It, therefore, appears that trait personality and waking preoccupations (i.e., state concerns) may manifest themselves differently in dream content.

There has been much work on the connection between dream content and various pathological personalities (e.g., Carrington, 1972; Cartwright, Lloyd, Knight & Trenholme, 1984; Kramer, 1970). In general, dreams have been found to distinguish pathological groups from matched controls. Despite this work, few efforts have been made to systematically explore the link between dreams and the personality of "normals". Without question, the majority of the personality / dreaming literature has focused on individual differences in dream recall (e.g., Bone, 1968; Cohen & Wolfe, 1973; Cohen, 1974a).

In his review of the dream recall literature, Cohen (1974b) concluded that personality was not a reliable predictor of dream recall, while dream salience, dream interruption and motivation were. In a study conducted soon after Cohen's (1974b) review, Cory, Ormiston, Simmel and Dainoff (1975) found a strong correlation between visual memory and dream recall and no correlation between personality and dream recall. Similarly, almost 20 years later, Tonay (1993) conducted perhaps the most comprehensive investigation to date on the relationship between personality and dream recall. She, like Cohen (1974b), found little support for such a link, again concluding that motivation and a positive attitude toward dreams were the best predictors of dream recall frequency.

Though it could be argued that dream recall must supersede any exploration of the contents of one's recall, dream content is still a likely place to search for the structure of personality. Moreover, if there is no relationship between personality and dream recall, then differences in dream recall should not be a confounding

factor when looking for links between dream content and personality. Compared to dream recall, it is surprising how few attempts have been made to examine the relationship between dream content and personality. There is evidence suggesting that dreams are affected by presleep mood (Cohen, 1974c; see Kramer, 1993 for discussion), and pre-sleep stress (De Koninck & Koulack, 1975; Koulack, Prevost, & De Koninck, 1985). However, these presleep states are transient in that they may change daily. Personality traits, conversely, are relatively stable and should not change markedly over short periods of time.

Samson & De Koninck (1986) found a negative relationship between waking and dreaming extraversion for subjects low on neuroticism on the Eysenck Personality Inventory (EPI). Their study is unique in that it transformed waking personality into dreaming personality by scoring how extraverted a person was in his/her dreams. Lang and O'Connor (1984) also used the EPI in their study of personality and dream content. These authors found that neuroticism correlated most strongly with the frequency, intensity and duration of various dream contents, while extraversion correlated least strongly with these dimensions of dreaming. Unlike Samson and De Koninck (1986), their findings indicated a continuity between personality and dream content. For example, "neurotic" subjects reported having more dreams involving personal failure and negative affect. However, it should be noted that Lang and O'Connor did not collect dream diaries, but rather used a dream questionnaire to assess dream experience. Thus, it is possible that their findings were mediated by an unmeasured variable such as response style

or self-concept (see Bernstein & Roberts, 1995, and discussion below).

Like Lang and O'Connor (1984), our previous work involved a comparison between personality and questionnaire reported dream content (Bernstein & Roberts, 1995; Bernstein, 1994). We were able to replicate some of Lang and O'Connor's findings but not others. In all, we found that the Five Factor Model of personality (FFM) was related to various aspects of dream content. However, we found different relationships in both of these studies, perhaps due to our use of different personality measures in the two studies.

In related studies, Hicks, Chancellor and Clark (1987) found that Type A college students reported more disturbing dreams than did Type B students. Gerber (1978) reported that repressors on the Repression-Sensitization Scale had better dream coping scores (i.e., dreams that ended pleasantly) than did sensitizers. Looking at waking coping styles, Rim (1986) found that dream content correlated positively with detachment, self-blame, wishful thinking and seeking social support, while dream content correlated negatively with problem-focused coping. Similarly, Felix-Gentil and Lader (1978) found a continuity between both psychopathology and waking attitudes and dream content in their study of anxious neurotic patients and high and low anxious neurotic controls. Finally, Rose and Perlis (1991) reported significant positive correlations among anxiety, depression, and hostility (measured by the Multiple Affects Adjective Check List) and both the frequency and intensity of aggressive interactions in dreams.

Perhaps the clearest demonstration of a relationship between trait

personality and dream content comes from a set of studies conducted by Donderi and colleagues. Cann and Donderi (1986) found a number of significant correlations between dream diary content and personality traits measured by the EPI and the Myers-Briggs Personality Inventory. However, these correlations resulted from a correlation matrix containing 90 correlations, 10 of which were found to be significant. Of these 10 significant correlations, 3 were correlations between personality attributes and dream report word length. In another study, Brown and Donderi (1986) found significant differences among the dreams of recurrent (i.e., those who experience recurring dreams), past-recurrent and non-recurrent dreamers as well as personality differences among these three groups.

Finally, there is some evidence suggesting that creative ability is related to various aspects of dreaming (Sylvia, Clark, & Monroe, 1978). This is a controversial issue, though, among dream researchers (see Wood, Sebba, & Domino, 1989-90 for refutation of the above evidence; see also Hunt, Ruzycki-Hunt, Pariak, & Belicki, 1993 for refutation of Wood et al's. refutation).

In short, the dream content and personality literature suggests that there is a link between personality and dream content. Despite its use of many different personality measures and its inconclusive array of findings, this area of research has managed to demonstrate some relationships between dream content and both state concerns (including psychopathology) and trait characteristics. Taking Cohen's (1978) optimistic claim that trait attributes measured during waking can be found in dream content, in the present study dream content was compared to

two of the most widely used personality trait measures that are believed to adequately detect basic personality traits (Costa & McCrae's, 1992, NEO-PI-R and Tellegen's, 1985 Multidimensional Personality Questionnaire).

I predicted that personality traits would be correlated with dream content (i.e., the continuity hypothesis). Such links, especially if demonstrated for both the DCQ and Diaries, would offer good evidence for the DCQ's construct validity. However, I hypothesized that this link would be stronger with the DCQ than with the Diaries, based on our previous findings (Bernstein & Roberts, 1995; Bernstein, 1994). Table 1 contains the present study's predictions for construct validity. These predictions were chosen for their obviousness and direct support for the continuity hypothesis rather than as a replication of previous findings. Thus, a direct mapping from personality to dream content was tested (irrespective of prior findings) by simply predicting the most sensible continuity between basic personality traits and dream content.

In addition to the above predictions, I also hypothesized that absorption (as it relates to imaginativeness) and spatial ability would be related to 1) lucid dream frequency, 2) dream bizarreness, and 3) nightmare frequency. These predictions were based on the work of Spadafora and Hunt (1990) and Hunt et al. (1993) who found that high dream recallers prone to unusual forms of dreaming (e.g., archetypal dreams, fantastic nightmares and lucid dreams) performed differently from one another on tests of spatial ability and imaginativeness. In the present study, lucid dream frequency and dream bizarreness were measured using both

the DCQ and Diaries. Nightmare frequency was tested using only the DCQ, because Wood and Bootzin (1990) have demonstrated a strong relationship between one's estimated nightmare frequency on a questionnaire and the frequency of nightmares reported in dream diaries. More specifically, I predicted a positive correlation between lucid dream frequency and spatial ability. In addition, given the work of Hunt and his colleagues, I predicted that imaginativeness would correlate more highly with lucidity and bizarreness than with nightmare frequency.

Table 1

Primary Predictions for Construct Validity

PERSONALITY TRAIT	ASSOCIATED DREAM CONTENT
Extraversion / Communal PEM	more dream Characters
Extraversion / Communal PEM	more Social Interactions
Neuroticism / Negative Emotionality	more negative Emotion
Neuroticism / Negative Emotionality	more Aggression
Neuroticism / Negative Emotionality	more Misfortune
Agreeableness	more Friendliness
Agreeableness	less Aggression
Openness / Absorption	more Bizarreness

Note. First indicated is the "Big-5" factor followed by its associated Multidimensional Personality Questionnaire factor or primary scale and the predicted dream content. Communal PEM = Communal Positive Emotionality (i.e., well-being and social closeness).

Discriminant Validity

Belicki (1986) has argued that absorption plays an important role in determining not only what a person recalls about his/her dreams, but also how he/she describes dreams and rates experiences. High absorbers tend to describe and rate experiences more saliently; therefore, rating scales of experience (akin to those found on the DCQ) may inadvertently measure absorption rather than the experience under investigation. In order to have adequate discriminant validity, the DCQ should contain a number of items and scales that do not correlate with absorption. I made four primary predictions to assess the DCQ's discriminant validity. In contrast to the prediction described above in which absorption should correlate with dream bizarreness, I expected trait absorption to be unrelated to friendliness, sex, aggression and number of characters in dreams.

Thus, there were two main goals in the present study. The first was to assess the reliability and validity of retrospective self-report questionnaires as measures of dream content. The second purpose of this work was to better determine the relationship between personality traits and dream content.

Method

Participants

One hundred and six psychology student volunteers received course credit for their participation in the study (76 women: mean age = 19.7 years, SD = 3.15, range = 17 to 42; 30 men: mean age = 22.9 years, SD = 6.66, range = 18 to 44). Signed informed consent was obtained from all participants before testing

commenced. Participants were identified by their student ID. All scoring of measures was done without any knowledge of the participants' identity.

Measures

Participants completed the following: Bernstein and Roberts' (1995) Dream Content Questionnaire (DCQ) modified so that every question could be answered using a 1-4 scale; a 14 day dream diary (henceforth called Diary); two separate personality inventories (Costa & McCrae's, 1992, NEO-PI-R and Tellegen's, 1982, Multidimensional Personality Questionnaire); Vandenberg & Kuse's (1978) Mental Rotations Test; Stein's (1975) Physiognomic Cues Test; and the absorption scale from the Multidimensional Personality Questionnaire (Tellegen & Atkinson, 1974).

The DCQ contains 30 core items, all of which the subject scores on a four point scale (see Appendix 1). Scales for friendliness, aggression, familiar settings and bizarreness were formed (see Scale Construction below). The DCQ attempts to capture dream experience by assessing one's retrospective, self-reported dream content.

The NEO-PI-R (Costa & McCrae, 1992) consists of 240 items rated on a 5-point scale. The NEO-PI-R is believed to tap the five basic dimensions of personality (John, 1990). These five factors are referred to as both the "Big-5" or the Five Factor Model (FFM) in the literature. Scores were obtained for Extraversion, Conscientiousness, Neuroticism, Agreeableness, and Openness to experience. The Neo-PI-R has high internal consistency and good test-retest reliability (Costa & McCrae, 1992). Furthermore, McCrae and John (1992) have

argued, with additional support from Church (1994), that all personality inventories contain parts of or all five factors of the FFM.

The Multidimensional Personality Questionnaire (Tellegen, 1982) contains 300 items answered true or false. It, like the NEO-PI-R, is thought to measure basic personality traits. There are eleven primary scales on the Multidimensional Personality Questionnaire. These scales load onto three factors, one of which can be split yielding a four factor solution (see Church, 1994 for discussion). Tellegen's four factor model was used in the present study. These factors are Agentic Positive Emotionality (PEM-A), Communal Positive Emotionality (PEM-C), Negative Emotionality (NEM), and Constraint. PEM-C, NEM, and Constraint resemble "Big-5" Extraversion, Neuroticism, and Conscientiousness, respectively. Absorption (an independent primary scale on the Multidimensional Personality Questionnaire) mostly resembles "Big-5" Openness to experience. "Big-5" Agreeableness has no direct associate on the Multidimensional Personality Questionnaire (see Church, 1994 for discussion). The Multidimensional Personality Questionnaire's reliability and validity have been well established (Tellegen, 1982; Church, 1994).

The Tellegen and Atkinson (1974) absorption scale consists of 34 True-False items from the Multidimensional Personality Questionnaire. Belicki (1984) derived an abbreviated scale by embedding 33 of these items in a 77 item questionnaire (containing 44 irrelevant items), following the procedure recommended by Tellegen and Atkinson (see Belicki, 1984, for the full

questionnaire). Belicki found this version to have high internal consistency (.87). This measure assesses absorption as a general personality trait. In the present study, Belicki's measure was reduced to 66 items. The full 34 absorption items were combined with 32 distractor items (see Appendix 2). To score absorption, all "true" responses from the 34 absorption items were summed.

The Mental Rotations Test (Vandenberg & Kuse, 1978) is a timed test (6 minutes total: two 3 minute sections) consisting of 20 items, each containing a source picture of a three-dimensional object followed by four target pictures of the object in various rotated states. The subject must match the source picture to two of the four target pictures. A total score is obtained by summing the number of correct items and multiplying this figure by two. Single items are marked "correct" only if both target pictures are correctly indicated. Also, it is possible to receive one point for an item (out of a possible two points), if only one target picture is chosen and marked. The Mental Rotations Test taps spatial ability. Men perform consistently better than women at this task (Vandenberg & Kuse, 1978).

The Physiognomic Cues Test (Stein, 1975) contains 32 items, each one a picture followed by two possible interpretations of the picture. One interpretation is always dynamic, while the other is always static. For example, a picture of diagonal lines is rated on a continuum from 1 to 6 as "driving rain" or "diagonal lines". This measure assesses one's tendency to both animate and anthropomorphize simple line drawings, which Spadafora and Hunt (1990) describe as a core aspect of metaphor generation.

Dream Scoring

Dreams were scored for content categories using a modified version of the Hall and Van De Castle (1966) scales for Social Interactions (Aggression, Friendliness and Sex), Emotions, Fortune (Good and Bad), Characters, and Settings. These scales are comprised of individual variables (e.g., Emotions = Happiness, Sadness, Apprehension, etc.). The scales were slightly modified to accommodate the possibility that the way in which participants interpret various questions on the DCQ may be quite different from how their dreams are scored for content using Hall and Van De Castle's criteria. More simply, all content scales were scored to reflect how we believed participants were interpreting the DCQ questions. For example, friendliness was scored based on how we thought participants interpreted friendliness in the following question: "How often do you have friendly interactions in your dreams?" According to the Hall and Van De Castle scoring criteria, Friendliness is scored quite liberally. Answering the door when it rings is considered a friendly interaction, because someone takes the initiative when it need not be taken. Activities like this were not scored, because we felt that participants completing the DCQ would probably not view such behavior as a friendly interaction. (see Appendix 3 for scoring manual).

Additionally, dream bizarreness was measured according to the method developed by Hunt, Ogilvie, Belicki, Belicki, and Atalick (1982). This method involves reading the dream report as if it were an account of a waking event. The judge then determines whether there is any evidence of bizarre or unusual thinking

/ experience. Specifically, scales for Clouding (e.g., confusion, memory gap), Hallucinosis (e.g., auditory or visual hallucination), and Archetypal content (e.g., mythical figures and setting) were scored.

In the course of dream scoring, the author was struck by the unusually high prevalence of exams in the dream reports. An additional category of Exam was, therefore, added. Diaries were scored for any mention of exams.

The order in which the dreams were scored was as follows: the last five scorable dreams (over 30 words) were scored from each 14 day period (total = 10 dreams per subject, if the participant turned in enough scorable dreams). This was done to minimize any possible effects the DCQ may have had on one's dream diary reporting style. That is, the first few dreams reported after completing the DCQ may be less representative of one's dream reporting style than those dreams reported later in the two week period, if the DCQ immediately impacts how one chooses to report dreams or more directly affects dream content. Dreams were scored within subject and session to ensure consistency (i.e., one participant's Session 1 dreams were scored and then the next participant's Session 1 dreams were scored. After all the Session 1 dreams were scored, Session 2 dreams were scored using this same procedure). All 818 dreams were scored for bizarreness and then the entire batch of dreams were scored for the other content categories using the method just described.

Procedure

As discussed below, 76 volunteers filled out the DCQ and kept a dream

diary for 14 consecutive days in early December, 1993. In the middle of January, 30 additional participants were recruited for the study and underwent this same procedure. As part of an in-class exercise conducted in early September, 1993, 74 participants had completed the NEO-PI-R, 71 had completed the Multidimensional Personality Questionnaire, and 68 had completed both personality measures. The December and January testing groups combined are henceforth called Session 1. In early March, 1994 (Session 2), 88 participants returned to fill out the DCQ again, to keep a dream diary and to take the Mental Rotations Test, Physiognomic Cues Test and the Tellegen and Atkinson absorption measure.

During Sessions 1 and 2, participants were tested in groups of three to twenty people on the questionnaires and paper and pencil tasks. During Session 1, participants were told that the purpose of the study was to determine what and how much college students typically dream. In Session 2, participants were given the DCQ, Physiognomic Cues Test and Tellegen and Atkinson absorption measure in random order and told to begin filling them out. The Mental Rotations Test was administered 15 minutes into testing, using the rules described by Vandenberg and Kuse (1978). After the Mental Rotations Test, participants returned to and completed the other questionnaires. Total testing time was approximately 40 minutes.

At the end of both sit down testing periods (Sessions 1 and 2), participants were asked to keep a dream diary at home (with forms provided) for 14 consecutive days. Participants were encouraged to report only one dream per

night (the most memorable) in as much detail as possible, but to report dreams honestly. They were told that for the purposes of the study, it was important to know how much or little and not only what people were dreaming. Participants were, therefore, discouraged from fabricating dreams.

Results

All probabilities cited are 2-tailed.

Sample Characteristics

Of the original 106 participants at Session 1, 90 returned their diaries with a total of 848 dreams (M = 9.4, range = 0 to 14 dreams). Of the 88 participants who returned for Session 2, 86 returned their diairies with a total of 663 dreams (M = 7.7, range = 0 to 14 dreams). This was a significant difference in the number of dreams returned, $t(82) = 5.37$, $p < .01$. Combining Sessions 1 and 2, 1511 dreams were returned. In all, 818 dreams were scored for dream content (see Method section on Dream Scoring for rationale and method for scoring).

Men were significantly older than women in the present study, $t(102) = -3.33$, $p < .01$. Although men and women returned approximately the same number of dreams overall, women's dreams were significantly longer than those of men (average number of words per dream and standard deviation for women and men: M = 109.4, $S.D.$ = 42.5; M = 82.7, $S.D.$ = 36.7, respectively), $t(91) = 2.77$, $p < .01$. As expected, men performed significantly better on the Mental Rotations Test than did women, $t(90) = -3.65$, $p < .01$. Finally, women and men performed no differently on either the Tellegen and Atkinson absorption measure or the

Physiognomic Cues Test ($p > .1$ for both).

To explore the comparability of this sample, Table 2 contains the response frequencies to various questions on the DCQ given to three independent samples over the past 5 years. Study 1 (Bernstein & Roberts, 1995) was conducted in 1989 at the University of California at Berkeley, while Study 2 (Bernstein, 1994) was conducted in 1992 at the University of California at Santa Cruz. Study 3 is the present investigation (conducted in 1993-1994 at Brock University in Ontario, Canada). The following variables were worded slightly differently in the three studies: One or more dreams each night; Participant in aggression; Friendly interactions; Sex; Looks forward to dreams. Despite the small differences in wording, the relative frequencies (i.e., content that occurred frequently vs. infrequently) were quite consistent for the various questions in the three independent samples (Spearman Rank correlations range = .65 to .94). Note that the item, Friendly Interactions, was worded differently in Study 1 than it was in Studies 2 and 3. The item's wording was identical in Studies 2 and 3.

Table 2

DCQ Response Frequencies in Three Independent Samples

VARIABLE	STUDY1 (N=78)	STUDY2 (N=60)	STUDY3a (N=106)	STUDY3b (N=88)
> 1 Dream Each Night	77%	85%	57%	64%
≥ 1 Lucid Dream a Month	55%	50%	55%	55%
≥ 1 Nightmare a month	40%	29%	36%	29%
Aggressive dreams	41%	48%	59%	51%
Participate in Agg.	58%	60%	55%	52%
Friendliness	52%	89%	100%	99%
Sexual dreams	68%	63%	74%	62%
Familiar Characters	99%	95%	94%	97%
Dreamer Alone	10%	9%	23%	9%
Not Central Character	49%	33%	55%	54%
Looks Forward to dreams	88%	89%	86%	89%

Note. Study 3 a and b refer to Sessions 1 and 2, respectively. Percentages were calculated in most cases by summing frequencies for the responses, "often" and "on occasion".

Scale Construction

Scales on the DCQ were derived as follows (see DeVellis, 1991 for discussion of this technique). Using Session 1, the sample was split in half (n = 52). Scales were then formed by standardizing variables and summing across items of interest. Scales with Cronbach's alphas above .60 were retained and cross-validated against the second half of the sample, still using Session 1. Scales with Cronbach's alphas above .60 in the second half of the sample were then retained and assessed for their test-retest reliability and their concurrent and construct validity. Single items of interest that were not used in scales were tested singly for the same psychometric properties just listed.

Using this strategy, scales for aggression, friendliness and dream bizarreness were obtained. The following contains the scale name, followed by the number of items in the scale and the Cronbach's Alpha for that scale: Aggression (16 items) = .75; Aggression (4 items) = .85; Aggressor (5 items) = .68; Friendliness (5 items) = .78; Bizarreness (14 items) = .84; Clouding / Hallucinosis (6 items) = .62; Archetypal (8 items) = .80. Note that the following scales all had inadequate internal consistency based on the first half of the sample during Session 1. These scales were still retained, because the predictions made regarding them could be equally true of all elements of the scale. Social Interactions (3 items: aggression, friendliness, sex) = .39; Emotion (6 items: happy, sad, confusion, anger, tranquility, apprehension) = .33; and Negative Emotion (4 items: sad, anger, confusion, apprehension) = .02.

Interjudge Reliability

Inter-judge reliabilities were obtained by correlating the set of scores that each rater gave to a particular dream. Some categories had low base rates. The problem here is that low base rates will inflate reliability estimates. For example, in a hypothetical situation in which one judge does not even read the reports but simply scores all dreams as "0" for all categories, a high interjudge reliability will still result. Therefore, a second and more conservative estimate of reliability was calculated by examining just those reports in which at least one judge rated the category as present. All reliabilities were acceptable (above .70), even when adopting the more stringent criterion. Table 3 contains the reliabilities based on the less stringent comparison of all scores between judges. In all, the table indicates that the dreams were scored consistently over time. The two scales for which we obtained low final reliabilities (Friendliness and Fortune) were also among the most problematic scales when we were trying to establish initial reliability.

Bizarreness. Inter-rater reliability for dream bizarreness was evaluated on the three categories of bizarreness described by Hunt et al. (1982): Clouding, Hallucinosis, and Archetypal content. The present investigator served as the primary rater, while Hunt served as the second rater. Clouding and hallucinosis were combined to form a single scale, because these are the most common types of dream bizarreness (Hunt et al., 1982). Total bizarreness was calculated by summing the two totals for the aforementioned scales.

To estimate whether there was significant scoring drift in bizarreness ratings from beginning to end, the entire sample of 818 scored dreams was split into thirds based on the order in which they were scored. The first and last thirds were then compared using a paired t-test to determine whether there was any significant difference in the amount of bizarreness scored. Because dreams were scored in random order, there should be no difference between the first and last third of the dreams scored. There was no significant difference between the frequency of any of the bizarreness variables in the first and last third.

Modified Hall & Van De Castle content scales. The other dream content scales were scored by a colleague. The present investigator served as second rater, and scored 109 dreams at the beginning and another 30 dreams at the end of the actual dream scoring to check for consistent inter-rater reliability over time. The following contains a description of the individual items that were combined to form the various scales.

Emotion. Because emotions are so uncommon in dreams, more dreams had to be scored in order to achieve reliability. Reliabilities are based on 109 dreams scored by both judges (Note: raters discussed discrepancies after scoring the first two sets of 30 dreams; however, the original scores were retained for calculating reliability). Due to the low reliability for the emotion, Happiness, it was combined with Tranquility to form a Positive Emotion scale. The negative emotions (Sadness, Anger, Confusion, Apprehension) were also combined to form a Negative Emotion scale. Note that neither of these scales had adequate internal

consistency (Cronbach's alphas below .50; see Scale Construction section). Also note that these scales are different from Positive Emotionality and Negative Emotionality on the Multidimensional Personality Questionnaire.

Aggression. Total Aggression (sum of all the following aggression variables: number of aggressions; physical aggressions; non-physical aggressions; aggressor or victim of non-physical and physical aggressions; aggressions towards men and women; aggressions from men and women; witnessing and participating in aggressions). If one dream is dropped on which the raters strongly disagreed, the reliabilities for aggression increase from .73 to .85 respectively.

Friendliness. Total Friendliness (number of friendly interactions, number of dreamer-initiated friendly interactions, number of hugs).

Sex. Single variable (number of sexual interactions).

Characters. Total Characters (number of male, female, and indefinite gender characters, number of characters, dreamer not in dream, and dreamer not the central character).

Good fortune / misfortune. Total Fortune (number of good fortunes and misfortunes).

Settings. Total Settings (number of indoor, outdoor, familiar indoor, familiar outdoor, unfamiliar indoor, and unfamiliar outdoor settings).

Table 3

Inter-Rater Reliability

SCALE NAME	PEARSON r^1	PEARSON r^2
Total Bizarreness	.84	--
Clouding / Hallucinosis	.88	--
Archetypal	.79	--
Total Emotion	.85	.76
Positive Emotion	.54	--
Negative Emotion	.90	--
Happiness	.44	--
Sadness	.80	--
Confusion	.77	.63
Anger	.70	1.00
Tranquility	1.00	--
Apprehension	.87	.69
Total Aggression	.73	.79
Number of Aggressions	.71	.82
Total Friendliness	.81	.59
Number of Friendly Interactions	.71	.72
Sex	1.00	.80
Total Characters	.92	.92

Table 3 (contd.)

SCALE NAME	PEARSON r^1	PEARSON r^2
Total Fortune	.84	.42
Total Settings	.92	.73

Note. Bizarreness content reliabilities (clouding, hallucinosis, and archetypal) were based on 26 dreams. Reliabilities for Emotions (Positive, Negative, Happiness, Sadness, Confusion, Anger, Tranquility, Apprehension) were based on 109 dreams. All other inter-rater reliabilities were based on 30 dreams. Dashes indicate that the value was not estimated.

1. Initial reliability obtained before dream scoring commenced

2. Final reliability obtained after all dreams were scored (n=30).

Test-Retest Reliability

Test-retest reliability for the DCQ was assessed by correlating the DCQ responses for both Sessions 1 and 2. Some items were expected to remain stable (e.g., number of dream characters, setting, aggression), while others were expected to change slightly to moderately (e.g., emotion). Diaries were also assessed for their test-retest reliability to safeguard against incorrect assumptions regarding the DCQ's test-retest strength. Partial correlations were calculated for the Diary content, controlling for the number of dreams scored.

Dream recall for both the DCQ and Diaries was stable over time ($r = .59$, $p < .01$; $r = .67$, $p < .01$, respectively). Nearly every question on the DCQ produced a significant test-retest correlation at $p < .05$ (60 out of 63 items). Less stability was evident in dream diary content (10 of 30 partial correlations on single variables were significant at $p < .05$).

Table 4 contains the test-retest reliability for the various scales and individual items (that could not form scales) on the DCQ. These same scales and items were also tested for their test-retest reliability in Diaries. Additional scales were formed for emotions and social interactions, even though these scales had poor internal consistencies (i.e., Cronbach's Alphas below .50). These three scales are included in Table 4 as well as Table 6 below, because they were used to test construct validity (see section below). They were not used to test concurrent validity.

Table 4

Test-Retest Reliability of the DCQ and Diaries

	DCQ1/DCQ2	DIARY1/DIARY2
Scales		
Aggression (16 items)	.72**	.24*
Aggression (4 items)	.73**	.29*
Aggressor (5 items)	.55**	.14
Friendliness (5 items)	.76**	.04
Familiar Settings (2 items)	.27**	.16
Bizarreness (14 items)	.80**	.37**
Clouding and Hallucinosis (6 items)	.72**	.35**
Archetypal (8 items)	.78**	.31**
Emotions (6 items)	.48**	.36**
Negative Emotions (4 items)	.61**	.35**
Social Interactions (3 items)	.72**	.32**
Single Items		
Dream Recall	.59**	.67**
Lucid dreams	.60**	-.04
Happiness	.59**	.08
Sadness	.33**	.18
Confusion	.50**	.07

Table 4 (Contd.)

	DCQ1/DCQ2	DIARY1/DIARY2
Anger	.41**	.51**
Tranquility	.28**	.49**
Apprehension	.33**	.33**
Aggressive dreams	.62**	.32**
Verbal Aggression	.27*	.11
Physical Aggression	.60**	.23*
Aggressor of physical aggr.	.66**	.30**
Victim of physical aggr.	.26*	.29**
Aggressor of verbal aggr.	.51**	-.04
Victim of verbal aggr.	.44**	.14
Aggression toward men	.58**	-.03
Aggression toward women	.58**	-.11
Aggression from men	.35**	.07
Aggression from women	.61**	-.02
Aggression toward self	.52**	--
Aggression from self	.33**	--
Witness aggression	.39**	--
Participate in aggression	.66**	--
Friendliness	.64**	-.00
Initiate friendliness	.49**	.05

Table 4 (Contd.)

	DCQ1/DCQ2	DIARY1/DIARY2
Hugs in dreams	.48**	-.06
Male Characters	.32**	.43**
Female Characters	.47**	.30**
Dreamer Alone	.27*	--
Two characters	.21	--
A few characters	.06	--
Many characters	.37**	--
Sex	.70**	.10
Good Fortune	.43**	.10
Misfortune	.46**	.02
Familiar indoor settings	.26*	-.02
Unfamiliar indoor settings	.26*	.11
Familiar outdoor settings	.18	.25*
Unfamiliar outdoor settings	.27*	.07

Note. The values reported for DCQ1/DCQ2 are simple correlations, while the values for Diary1/Diary2 are partial correlations. Dashes indicate the value was not estimated.

* $p < .05$ ** $p < .01$

As can be seen from Table 4, the DCQ had far better test-retest reliability than did the Diaries. Among the most consistent content in Diaries were aggression, bizarreness, male and female characters, and the emotions, anger, apprehension and tranquility. Other content items including friendliness, sex, and settings were inconsistent over time.

Concurrent Validity

Concurrent validity was assessed by comparing the DCQ to the dream diaries for the two sessions separately for both sets of data. The scales on the DCQ were compared to the corresponding scales in the Diaries. All comparisons between single items on the DCQ and the Diary were performed using raw data. For each individual, a total score for each variable (e.g., misfortune) was calculated by summing the raw frequencies for that variable in the first five dreams and then again in the second five dreams. For example, total dreamed misfortune for Session 1 was calculated by summing the number of misfortunes in the five dream diaries that comprised Sessions 1. To control for the fact that some participants returned fewer than 10 dreams, partial correlations were calculated between the DCQ and Diaries, partialling out the number of dreams scored. The sum scores in the Diaries were then compared to the corresponding DCQ variable(s). Table 5 contains the partial correlations for Sessions 1 and 2.

Table 5

Concurrent Validity for Sessions 1 and 2

	SESS 1	SESS 2
Scales		
Aggression (16 items)	.27*	.18
Aggression (4 items)	.28**	.20
Aggressor (5 items)	.20	.18
Friendliness (5 items)	-.07	.11
Familiar Settings (2 items)	.07	.06
Bizarreness (14 items)	.16	-.05
Clouding and Hallucinosis (6 items)	.16	-.12
Archetypal (8 items)	.05	.19
Emotions (6 items)	--	--
Negative Emotions (4 items)	--	--
Social Interactions (3 items)	--	--
Single Items		
Dream Recall	.45**	.66**
Lucid dreams	.23*	.09
Happiness	.06	.01
Sadness	.05	.15
Confusion	-.18	-.10

Table 5 (Contd.)	SESS 1	SESS 2
Anger	.03	.12
Tranquility	.01	.04
Apprehension	.21	.14
Aggressive dreams	.36**	.26*
Verbal Aggression	.17	.02
Physical Aggression	.29**	.12
Friendliness	-.16	.23*
Male Characters	.19	.11
Female Characters	.04	.09
Dreamer Alone	-.24*	-.00
Dreamer with many characters	.06	.07
Sex	.18	-.03
Good Fortune	.21*	-.03
Misfortune	-.07	-.15
Familiar indoor settings	-.00	-.02
Unfamiliar indoor settings	.14	.01
Familiar outdoor settings	.02	.06
Unfamiliar outdoor settings	.10	.22

Note. The values reported for Sessions 1 and 2 are partial correlations. Dashes indicate the value was not estimated.

* $p < .05$ ** $p < .01$

As can be seen from Table 5, participants' estimates of their dream recall (DCQ1) correlated significantly with the number of dream diaries they returned for Session 1 (r = .45, p < .01). Furthermore, at Session 2, participants were even better at estimating their dream recall (r = .66, p < .01). This, in fact, was a significant increase, z = -1.98, p<.05. These findings suggest that participants were quite good at estimating their dream recall and also that they improved their ability to estimate dream recall after they were exposed to the DCQ and after they had kept a dream diary. Also evident in Table 5 is that many of the DCQ scales and individual items were slightly correlated with dream diaries at Session 1, but were uncorrelated with Diaries at Session 2 (8 out of 31 and only 3 out of 31 of the identical partial correlations were significant for Sessions 1 and 2, respectively).

Construct Validity

Construct validity was evaluated by determining the relationship between dream content (measured by the DCQ) and personality (assessed by the NEO-PI=R and Multidimensional Personality Questionnaire). Cronbach's alphas were computed for each of the higher order factors from these two inventories to ensure the normalcy of our sample (N=56). Note that these analyses were performed on the NEO-PI-R and Multidimensional Personality Questionnaire primary scales and not on the individual items that comprise each scale. For the NEO-PI-R, they were all acceptable: Extraversion (.83); Agreeableness (.85); Conscientiousness (.79); Neuroticism (.71); Openness to experience (.78). Conversely, with the exception of NEM (.65), the Cronbach's alphas for the other three Multidimensional

Personality Questionnaire higher order factors were unacceptable (below .50). In the case of PEM-C, the two primary scales (well being and social closeness) correlated .54 with one another. This inter-correlation was considered high enough to warrant combining the items to form a single scale (PEM-C).

Eight primary predictions were tested by comparing dream content on the DCQ and in Diaries to the NEO-PI-R and associated factors or scales on the Multidimensional Personality Questionnaire. Additionally, absorption, imaginativeness and spatial ability (measured on the Tellegen and Atkinson absorption measure, Mental Rotations Test and Physiognomic Cues Test, respectively) were compared to various facets of dream content in the Diaries and on the DCQ. When summing the Physiognomic Cues Test and the Tellegen and Atkinson absorption measure, scores were pro-rated by replacing cases with only one missing value with the mean of that participant's score calculated without that item. For the Physiognomic Cues Test, five missing values were replaced with their respective means. For the Tellegen and Atkinson absorption measure, six missing values were replaced. The internal consistency for the 34 absorption items on the Tellegen and Atkinson absorption measure was .87 (identical to that found by Belicki, 1984). Because the Tellegen and Atkinson absorption measure is taken directly from the absorption scale on the Multidimensional Personality Questionnaire, these measures should be highly correlated. In the present study, these measures correlated .80 with each other. Since the Tellegen and Atkinson absorption measure and the Multidimensional Personality Questionnaire were

administered seven months apart, this trait was quite stable over time.

For all predictions, in the case of the DCQ, simple correlations were employed. Partial correlations were performed on the Diaries, again controlling for the number of dreams scored. Note that "Big-5" Agreeableness has no Multidimensional Personality Questionnaire associate and that "Big-5" Conscientiousness was not included in the predictions. To test the relationships among spatial ability, imaginativeness and absorption on the Mental Rotations Test, Physiognomic Cues Test and Tellegen and Atkinson absorption measure and dream content, the DCQ from Session 1 was chosen to avoid any possible influence these measures (all administered during Session 2) might have had on people's DCQ responses. Table 6 contains the specific trait personality / dream content predictions.

Table 6

Construct Validity of the DCQ

BIG-5 / MPQ FACTOR	DREAM CONTENT	DCQ	DIARY
Extraversion / PEM-C	More Characters	.22 / .20	-.19 / .03
Extraversion / PEM-C	More Social Interactions	.27* / -.05	.16 / -.07
Neuroticism / NEM	More Negative emotions	.32** /.40**	.13 /.10
Neuroticism / NEM	More Aggression	.27* / .27*	.13 / .13
Neuroticism / NEM	More Misfortune	.19 / .11	.13 / .14
Agreeableness / --	More Friendliness	.27* / --	-.13 / --
Agreeableness / --	Less Aggression	-.26* / --	-.08 / --
Openness / Absorption	More Bizarreness	.38** / .28*	.23 / .09

Note. MPQ = Multidimensional Personality Questionnaire; PEM-C = Communal Positive Emotionality; NEM = Negative Emotionality. Social Interactions, Negative Emotions, Aggression, Friendliness and Bizarreness are all scales, while Characters and Misfortune are single variables. Dashes indicate the value was not estimated.

* $p < .05$ ** $p < .01$.

Personality correlated better with one's questionnaire reported dream content than with dream diary content. Personality did not correlate with any of the dream diary content items or scales, while personality did correlate strongly with DCQ reported dream content. Of the eight personality predictions tested with the NEO-PI-R, six were significant at $p < .05$, and one showed a trend ($p < .1$). Similarly, three out of the six predictions using the Multidimensional Personality Questionnaire were significant at $p < .05$, while one demonstrated a trend ($p < .1$). When all five factors of the "Big-5" were used to predict each of the DCQ responses listed in Table 6, the R-squared values ranged from .16 to .38. Thus, the "Big-5" (assessed by the NEO-PI-R) accounted for anywhere between 16 to 38 percent of the total variance in these DCQ responses.

The predicted correlation between spatial ability (measured by the Mental Rotations Test) and DCQ reported Lucidity frequency was not supported ($p > .1$). As predicted, though, imaginativeness (measured by the Physiognomic Cues Test) did correlate with both DCQ estimated lucidity ($r = .36$, $p < .01$), and as a trend with DCQ reported clouding-hallucinosis ($r = .21$, $p < .1$). Contrary to prediction, the Physiognomic Cues Test correlated as strongly with DCQ estimated nightmare frequency ($r = .34$, $p < .01$) as it did with DCQ lucidity and clouding-hallucinosis. When these same analyses were performed between the dream diaries and the Physiognomic Cues Test, the relationships were in the correct direction but were not significant: lucidity ($pr = .16$, $p > .1$); clouding-hallucinosis ($pr = .18$, $p = .1$).

Finally, absorption (from the Tellegen & Atkinson measure) correlated

significantly with DCQ reported bizarreness but not with Diary bizarreness ($p > .1$ for all Diary analyses). The correlations obtained between DCQ bizarreness and the Tellegen and Atkinson absorption measure were as follows: clouding-hallucinosis ($r = .23$, $p < .05$); archetypal ($r = .36$, $p < .01$); total bizarreness ($r = .34$, $p < .01$).

To test the notion that dream content is sensitive to waking state concerns, Diaries were scored for the presence of any mention of exams. Session 1 coincided with final exams while Session 2 occurred after participants returned from a one week holiday. The mean mention of exams in dreams from the two Sessions were compared to each other using a simple paired t-test. However, only the 76 participants from Session 1 who completed their Diaries in early December and then again in March were used in this analysis. One participant was excluded from analysis, because she filled out her Session 1 Diary over a two month period. As predicted, there was significantly more mention of exams in Session 1 ($M = .43$ per dream) than in Session 2 ($M = .14$ per dream), $t(50) = 2.05$, $p < .05$.

Discriminant Validity

Discriminant validity was measured by comparing certain items on the DCQ to trait absorption. As predicted, the Tellegen and Atkinson absorption measure was related to DCQ bizarreness (reported above in Construct Validity), while it was unrelated to DCQ friendliness, number of dream characters, sex, or aggression ($p > .20$ for all).

Post-Hoc Analyses

Given the relatively low correspondence between DCQ reported dream content and Diary content, further analyses were performed to better determine the DCQ's utility. The following predictions tested three different memory hypotheses.

First, I predicted that people's DCQ reported dream content would correlate more strongly with Diary content after they had been exposed to the DCQ and had kept a 14-day dream diary. This was tested by performing a sign test on the pairs of partial correlations for Session 1 and Session 2 reported above (Concurrent Validity section). Rather than improving, the correlations actually declined over time, (chi-square = 5.02, $p < .05$).

Second, I predicted that high dream recallers, because of their better memory for dreaming, would have comparatively higher correlations between their DCQ reported dream content and their Diary content than would low recallers. High and low recallers were selected according to the following criteria: High = 20 or more dreams returned in 4 weeks and Session 1 DCQ estimated dream recall of more than 3 dreams a week; Low = 14 or fewer dreams returned in 4 weeks and fewer than 3 dreams recalled per week on the DCQ during Session 1. Note that this separation contained a subset of the study's total N. The n's for the High and Low Recall groups were 28 and 22, respectively. As in the test of concurrent validity, partial correlations were calculated for high and low recallers separately, controlling for the number of dreams scored, and then the two sets of correlations were compared using a sign test. The correlations for high and low recallers were

not significantly different (chi-square = 1.2, $p > .1$). That is, the correlations between DCQ and Diary reported dream content were equally low for both high and low recallers.

Finally, I tested whether people's DCQ reported dream content would correlate more strongly with their Diary content if their most salient dream was chosen to represent their more salient dream life. That is, do people answer questions on the DCQ by recalling a prototypically salient dream (subsequently referred to as the salience hypothesis)? This was tested using only the 3 bizarreness variables (clouding, hallucinosis, archetypal). The most salient dream (out of the maximum 10 dreams scored) for each variable was chosen according to whether it had the highest frequency for that variable (e.g., the most clouding). This single dream (e.g., the dream with the most clouding) was then compared to DCQ reported bizarreness (e.g., clouding) using a simple correlation. Findings were inconsistent. While there was a trend for people's DCQ reported dream clouding to correlate with the amount of clouding observed in their most salient dream, $r = .18$, $p < .1$, there was a similar drop in predictability with the category of hallucinosis, $r = -.18$, $p < .1$). Archetypal content was unaffected.

Discussion

Questionnaires are widely used in the social sciences. Their utility often springs from their simplicity. Dream content is typically assessed by scoring home dream diaries or laboratory reports (Winget & Kramer 1979). Compared to questionnaires, these methods are costly and time-consuming and inevitably

involve a certain amount of judgment error. Therefore, the present study was conducted to determine the viability of a simple, inexpensive, and expedient means of assessing dream experience: the questionnaire. Unfortunately, questionnaires are often not assessed for their reliability and validity before they are employed in a variety of studies. This is particularly the case in dream research. The present investigation is the first to consider the issues surrounding the psychometric properties of retrospective self-report dream content questionnaires.

A Dream Content Questionnaire (DCQ) has been under development for the past 5 years (Bernstein & Roberts, 1992, 1995; Bernstein, 1994). The DCQ was developed for psychometric testing. It was specifically designed to mirror Hall and Van De Castle's (1966) dream content scoring system, which is arguably the most widely used system in dream research. The DCQ, like Hall and Van De Castle's scoring criteria, attempts to capture the broad categories of dream experience. The DCQ was not invented to replace existing measures of dream content, but to complement them.

We previously demonstrated that the DCQ may produce similar sets of data to those obtained using diaries or laboratory reports (Bernstein & Roberts, 1995). However, the scope of our previous work was limited in that dreams in any one study were only assessed by means of the DCQ, which was then compared to published norms but not directly to diaries. In contrast to our previous work, the present study directly compared the DCQ to dream diaries. Participants were given these measures on two separate occasions three months apart. Additionally,

participants completed two trait personality measures, a spatial ability measure and an imaginativeness measure. The psychometric properties of the DCQ and diaries were then assessed.

Reliability of the DCQ And Diaries

The various scales derived from the DCQ had acceptable internal consistency and very good test-retest reliability. The test-retest correlations of the individual items that could not form scales were not as high as those of the scales, but they were still acceptable in many cases. Overall, people's responses to the DCQ during Session 1 were significantly correlated with their responses three months later (Session 2). In addition to this consistency within individuals over time, various items on the DCQ have produced highly similar response frequencies in three independent samples tested over the past 5 years (see Table 2; cf., Bernstein, 1994; Bernstein & Roberts, 1995).

Unlike the scales and single items on the DCQ which had good test-retest reliability, most of the corresponding content categories in the dream diaries had relatively poor test-retest reliability. Whereas 60 of the 63 individual items on the DCQ were significantly correlated between the two sessions, only 10 of the 30 diary content items resulted in significant test-retest correlations, and many of these were quite low (below .30). This latter ratio is rather surprising, given the repetitiveness of dream content (see Domhoff, 1993 for discussion).

Domhoff's (1993) review of the relative stability of dream content over long periods of time (in some cases, over 30 years) suggests that dream diary content

as measured by the Hall and Van De Castle (1966) scales is generally quite stable over time within individuals. Similarly, in a set of investigations, Kramer and colleagues report consistency in laboratory dream content (again using the Hall and Van De Castle scales) over a 20 day period within individuals (Kramer, Hlasny, Jacobs & Roth, 1976; Kramer & Roth, 1979). Kramer et. al (1976) found that judges were able to accurately distinguish among the dreams of different people (normal controls and schizophrenic patients) and among the dreams of one person on different nights. In their later study, Kramer and Roth reported an average night to night correlation in dream content of .46; however, these authors only reported the correlations in dream content between any two consecutive nights over the 20 day testing period. That is, they did not report correlations between dream content in the first night's dreams and the same content in the last night's dreams (akin to the analyses performed in the present investigation). Viewed from the perspective of personality research, .46 is a low correlation for such a short period of time. These findings suggest that dream content may be relatively stable over very short (2 days) and long (up to 30 years) periods of time.

The present study's findings indicate that dream diary content is not highly consistent over a three month period. Domhoff (1993) mentions that variables with high frequencies (e.g., aggression, settings) are the most stable over time, while less frequent variables (e.g., emotion) are less stable. In the present study, emotions (especially anger) were among the most stable dream content elements, while friendliness and settings were among the least stable.

There are at least two possible explanations for the overall instability in dream content observed in the present study. First, dream content assessed by scales like those of Hall and Van De Castle (1966) may not be very stable over a three month period. If this is so, then we will not likely see strong correlations between people's questionnaire reports of their typical dream experience and diary reported dream content (see concurrent validity below). Moreover, we will not find consistent relationships between dream diary content and stable dispositions like personality (see construct validity below).

Another possible explanation is that dream content is usually stable over a three month period but not at this time in this sample. That is, the participants in the present study might not represent the typical population. This is certainly possible given that many of the sample were in their first year of university and likely experiencing considerable life changes. If this is the case, then once again we cannot expect to find correspondences between this sample's DCQ reported dream content and their dream diary content. Because the DCQ asks for stable trends in dream content, respondents undergoing marked life changes may not be able to report their typical dream experience. Whichever explanation is correct, dream diary content in the present sample was unstable over the 3 months that separated Sessions 1 and 2 while DCQ reported content was very stable. This instability in dream diary content implies that the dream diaries in the present study are not optimal for testing the DCQ's concurrent validity.

In addition to the DCQ's superior test-retest strength over that of diaries, a

frequent obstacle with diaries that often goes unmentioned in studies of dream content is that of inter-rater reliability (Van De Castle, 1969). It is important to realize that once test-retest reliability has been achieved, the biggest potential threat to reliability on a questionnaire is the possibility that data will be coded and/or entered incorrectly into the computer. This is in contrast to the compounded problem in typical dream scoring where inter-rater reliability and data entry can be potential sources of error. Although many raters have experienced difficulty obtaining strong inter-judge reliability when scoring dream reports for content (Hall & Van De Castle, 1966; this was also the case in the present investigation), few studies have commented on this as a relative shortcoming of this approach to analyzing dreams.

Concurrent Validity of the DCQ

Given the reliability problems associated with dream diaries in the present study (moderate inter-judge and major test-retest), there are serious constraints placed on validity. This is particularly so given that dream content in the present sample, as measured by diaries, was highly variable. When the DCQ scales and single items were compared to the corresponding scales and items in the dream diaries (test of concurrent validity), some interesting findings emerged. There were a number of significant correlations between DCQ reported content and subsequently reported dream diary content during Session 1. The highest correlations were the frequency and type of aggression in dreams, the frequency with which the dreamer is alone in dreams, the frequency of lucid dreams, the

number of male characters and the frequency of good fortune in dreams. Conversely, there was no correlation between one's DCQ reported friendliness and misfortune and the actual incidence of these contents in their dream diaries. At Session 2, there were even fewer correlations between DCQ and diary reported dream content. This was after participants had been exposed to the DCQ once before and had kept a dream diary for two weeks.

One possible explanation for this drop might be that participants were less motivated at Session 2. Participants returned significantly fewer dreams during Session 2 than during Session 1. If this drop was due to lower motivation and thus more error, then perhaps this contributed to the lower correlations between the DCQ and diaries observed at Session 2. Another possible explanation for this drop is that because participants completed the DCQ prior to keeping a diary, their responses on the DCQ most likely reflected the dream content corresponding to the period just prior to when the dream diary content was collected. Thus, the DCQ responses could not be expected to correlate with the subsequent diary content (which, as we just discussed, was highly variable).

Unrelated to participant compliance, a potential problem with the DCQ is that it is not clear how memory affects the way in which respondents answer individual items on retrospective self-report questionnaires. For instance, how many dreams and what types of dreams does a person call to mind when attempting to answer the following question: "How often do you initiate friendly interactions in your dreams?" One possibility is that a person would generally

recall a few salient dreams while responding to items on the DCQ. These salient dreams would then be used by the respondent to represent his/her typical dream experience. To test this, I chose the most salient dream returned (out of 10 dreams scored) in the hopes that this dream would be representative of the dreamer's more salient dream life. Despite these efforts, people's dream content reported on the DCQ was no more highly correlated with their most salient dream than it was with their entire batch of dreams.

Related to this issue of memory and response, it also seems possible that people may be recalling their most recent dream when completing the DCQ. This most recent dream will likely be less salient than the one chosen by us to test the salience hypothesis. If so, then this would explain at least in part why the most salient dream returned was not correlated with one's DCQ reported dream content. This notion deserves further consideration. It would be relatively easy in future investigations to collect a most recent dream from participants and then to give them a dream questionnaire such as the DCQ to see if the two measures are more closely correlated.

Yet another way of discriminating good and poor estimators of dream content is to separate high and low recallers. I predicted that high dream recallers would be better at estimating their dream life than would low recallers, because high recallers should have better access to their dreams. This too was not borne out by the findings. High and low recallers were equal at estimating their dream content on the DCQ.

None of the three memory hypotheses tested in the present study (exposure to dream experience through the DCQ and keeping a dream diary, high versus low dream recallers, dream salience) could account for the relatively low correspondence between one's DCQ reported dream content and dream diary content. Moreover, none of these hypotheses could explain why the correlations between the DCQ and diary reported dream content actually worsened over time. These findings coupled with the low test-retest correlations for diary content indicate that the DCQ's concurrent validity needs additional assessment. One such assessment in future work would be to ask participants to first keep a dream diary and then to complete the DCQ.

A potential problem with a questionnaire like the DCQ, which could also be construed as a strength, is that the DCQ asks for typical patterns of dream experience. Participants are required to answer general questions about their dreams which may not reflect their dreams in relation to other dreamers' dreams. The DCQ's response choices, "often", "on occasion", "rarely" and "never" are not quantified or defined for the respondent. Therefore, more specific questions like, "Was there any aggression in the last dream you remember?" might better elicit the type of information that could then be directly compared to other dreamers. Kidder, Judd and Smith (1986) contend that this latter type of question "offers better cues for recall by anchoring the respondent to the concrete instance" (p.242).

Construct Validity of the DCQ

The DCQ's construct validity was assessed by examining the relationship between the DCQ and well established measures of trait personality. However, before discussing the DCQ's construct validity, it is important to ask oneself whether dream diaries have adequate construct validity. It has long been suggested that dreams are continuous with waking life in that they reflect daily preoccupations and concerns (e.g., Calkins, 1893; Freud's, 1900 "day residue" observation of dream content). More recently, Hall & Nordby (1972) have dubbed this view the continuity hypothesis. Certainly this notion would suggest that dream diaries do in fact contain adequate construct validity. Perhaps consonant with this view, in the present study, participants' dream diaries contained significantly more mention of exams while participants were taking final exams than when the same participants had just returned from a one week break from school. These data demonstrate that diaries can be consistent with state specific concerns.

What happens, then, when one shifts the focus from the state aspects of personality to trait measures of personality? That is, do dreams reflect the structure of personality as theoretically described by trait theory? Waking behavior was assessed by two standard trait personality inventories (the NEO-PI-R and the Multidimensional Personality Questionnaire). The DCQ correlated significantly with trait personality in both of these measures, while dream diary content was unrelated to these measures of trait personality. Further, when all five factors of the Five Factor Model were used together to predict DCQ responses, the total variance accounted for ranged from 16 to 38 percent. Although substantial, these

values suggest that the DCQ is not subsumed entirely by trait personality.

Similar to the above pattern of findings, DCQ bizarreness was significantly related to imaginativeness while Diary bizarreness was not. This is in partial contrast to Spadafora and Hunt's (1990) data which showed that both questionnaire estimates and diary frequencies of archetypal content were related to a composite measure of absorption / imaginativeness (including the Physiognomic Cues Test and the Differential Personality Questionnaire: the two measures used in the present study). This disparity in findings may be due to sampling differences. Spadafora and Hunt used a sample of high dream recallers prone to unusual forms of dreaming (i.e., archetypal dreams, lucid dreams, and fantastic nightmares). Participants in the present study were chosen to represent the general dreaming population (at least as normal as can be obtained from an introductory psychology course). In addition, it is possible that the Spadafora and Hunt sample had more consistent dream content than the present study's sample.

Returning to the relationship between dream content and state versus trait personality, mention should be made of the constraints imposed on both the dream diary and the DCQ's construct validity by the low test-retest reliability in diary content observed in the present study. The instability in dream diary content in the present sample precludes any possibility of finding relationships between stable dispositions (e.g., trait personality) and dream diary content. The present study's findings indicate that while dream diaries reflect waking concerns and preoccupations, they may not reveal obvious manifestations of trait personality if

dream content is highly variable over time. In this regard, the DCQ appears to be less useful than diaries as a measure of state personality, while as a measure of trait personality, the DCQ may be better than diaries.

There is also the possibility that dream diaries can reveal the structure of personality, but not as conceptualized by the Five Factor Model. That is, perhaps the problem here is the way in which trait personality has been operationalized. Indeed, Hall (1969) warns that

> "It is futile to derive a set of categories from a personality theory and then find that these categories are rarely represented in dreams. Dreams may have little or no relevance for some theories of personality" (p. 176).

It is worth noting the difference between the two foundations upon which dream scoring criteria are generally based. As Hall and Van De Castle (1966) demonstrate, one may choose to employ empirical or theoretical scales or both when constructing a dream content scoring protocol. Empirical scales, like the ones employed in the present investigation, may have little chance of correlating strongly with elaborate operationalizations of trait theory. Conversely, theoretical scales, if carefully conceived and constructed, stand a far greater chance of revealing the structure of personality (Hall, 1969). Thus, it would be useful in future studies to content analyze dreams for any evidence of trait personality using a theoretically based approach. This is akin to Samson and De Koninck's (1986) work in which dreams were scored for the presence or absence of trait dispositions like extraversion.

What, then, do the correlations between the DCQ and trait personality

represent? In our first investigation into the utility of a dream content questionnaire (Bernstein & Roberts, 1995), we suggested that the way in which people remember their dreams when filling out a questionnaire such as the DCQ may be a direct reflection of how they view themselves. Although the present study was unable to directly address this question, the fact that personality traits were highly correlated with one's DCQ reported dream experience, while the same personality traits were not at all related to dream diary content may offer further evidence for this view.

Elaborating this view, I would propose that dreams are most likely continuous with state concerns of waking life, but that the way in which we retrospectively recall them on a questionnaire is largely a function of how we view ourselves. That is, we dream about issues with which we are preoccupied, but we remember patterns of our dream life consonant with how we view ourselves. [1] Nearly a half century ago, Calvin Hall (1951) contended that

> During sleep we think about our problems and predicaments, our fears and hopes. The dreamer thinks about himself: what kind of person he is and how well fitted he is to deal with his conflicts and anxieties (p.4).

Thus, my own argument here is really nothing new. I agree with Hall's assertion, but would merely add that what people retrospectively recall about their dreams is the content most sonorous with their self-concept. If this is so, then it might

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[1] Some prior work on dream recall has concentrated on the various factors that affect one's ability to recall dreams soon after awakening (see Cohen, 1974b for review). What I am interested in here is how people retrospectively recall patterns of their dream experience.

explain at least in part why trait personality correlated highly with one's DCQ reported dream content and not at all with dream diary content.

There are several possible explanations for the absence of association between dream diaries and personality traits found in the present study: 1) Dream diary content may not reflect the structure of personality as described by trait theory and operationally described by the NEO-PI-R and the Multidimensional Personality Questionnaire; 2) dream diary content may reflect the state concerns rather than the stable structure of personality. If 1 or 2 is true, then it is most parsimonious to conclude that dream diaries are valid and that the DCQ is not; 3) dream diary content may reflect the structure of personality, but not as defined by trait theory and/or the NEO-PI-R and the Multidimensional Personality Questionnaire; 4) the way in which dream diaries are scored using the Hall and Van De Castle (1966) system may not reveal the structure of personality; 5) dream diaries do not capture the essence of personality structure due to our inability to communicate our true dream experience (see Cohen, 1974b, 1979 for reviews). If 3, 4 or 5 is true, then the DCQ may be valid and dream diaries (especially how they are scored) may be suspect. Certainly, future investigations into the relationship between personality and dream content should be cognizant of these issues.

Discriminant Validity of the DCQ

In order to have discriminant validity, it is necessary to demonstrate "the absence of correlation between measures of unrelated constructs" (DeVellis, 1991,

p.50). As predicted, trait absorption was related to DCQ reported dream bizarreness while it was unrelated to other items on the DCQ (friendliness, number of dream characters, sex and aggression). Past research has shown that absorption can be a potential source of invalidity in dream content studies, because high absorbers rate and describe their experiences more saliently (Belicki, 1986). Steps were taken to minimize this source of error by asking very specific questions about dream content (e.g., "How often do you have physical aggression in your dreams?"). Other types of questions that ask for an overall evaluation of dream life (e.g., "How vivid are your dreams?") were avoided, because these questions could be highly mediated by one's level of absorption. Thus, absorption did not mediate people's DCQ responses in the present study.

However, the personality results mentioned above as part of construct validity complicate matters. Because personality traits were so highly correlated with DCQ reported dream content and not with diary content, there is the possibility that the DCQ is being mediated by an unmeasured construct. This construct, as I have just argued, may be self-concept. That is, the way in which people respond to items on the DCQ may have more to do with how people view themselves than with what their dreams are about. Had the dream diaries been more consistent over time, this issue could have been examined more thoroughly. To fully address this issue in future work, a separate measure of self-concept should be given to participants.

How to Account for Problems with the DCQ's Psychometric Properties

What, then may we conclude about the DCQ's psychometric properties as a whole? The DCQ is quite reliable, shows adequate discriminate validity when items are worded in a manner that prevents high absorbers from responding in the superlative, and demonstrates good construct validity. The DCQ's concurrent validity could not be assessed adequately in the present investigation due to an instability in dream diary content over time.

Historically, dream researchers have tended to regard verbal or written dream reports as the benchmarks of dream experience. Besides the seminal work of Hall and Van De Castle (1966) and many other attempts to develop accurate measures to assess and score dream content (see Winget & Kramer, 1979 for review), nobody has managed to unambiguously demonstrate the validity of either dream diaries or laboratory dream reports as true measures of dream experience. The problem is that there is really no way to test this notion. Dreams and all mental experiences are by their very nature shielded from the objective eye. Dream researchers, like many cognitive scientists, are thus entirely reliant upon the (sleep) mentation report as an accurate depiction of the contents of one's mental experience.

If we assume that dream diaries are valid measures of dream content and that the Hall and Van De Castle (1966) content scoring system accurately categorizes dream content, then the present study's findings raise some concern about the DCQ's validity. If, however, we grant that diaries may not be entirely valid measures of dream content or that the Hall and Van De Castle scoring

system may be inappropriate for measuring the structure of personality, then we may continue to assume that dream questionnaires (and the DCQ in particular) are potentially valid. It is also possible that both diaries and the DCQ are valid, but that the two measures assess distinct aspects of dreaming. For instance, the DCQ may reflect a supraordinate construct called dreaming that each person defines independently, while dream diaries reveal the highly variable day-to-day events of a person's life. If this is so, then perhaps by utilizing both dream diaries and a dream questionnaire (such as the DCQ), investigators could tap a broader range of the dream experience than that revealed using either measure alone. Finally, there is the possibility that the present study's sample does not generalize to the population as a whole. If the participants in this study were experiencing significant life changes and if their dreams faithfully marked these shifts, then very little can be concluded about the ordinary validity of either the DCQ or the dream diaries.

Conclusion

What does all this say about the utility of retrospective questionnaire measures of dream content? The present study's findings highlight some of the difficulty in measuring dream experience. As a tool to retrospectively measure dream content, the DCQ appears to have good test-retest reliability and both construct and discriminant validity. However, it is difficult to fully interpret the meaning of these findings on the basis of this study, because unlike the DCQ, dream diaries (at least in the present study) demonstrated relatively less

consistency over time and correspondingly poorer relationships to stable personality traits. Additional work is needed to answer whether this disparity addresses fundamental issues in how personality relates to dream content, or perhaps more importantly, whether such inconsistencies expose some of the psychometric inadequacies inherent in measures of dream experience.

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Appendix 1 Dream Content Questionnaire

I.D._____ Sex: M F

Age:

The following questions all deal with dreams. If you do not remember your dreams, please try to answer the questions to the best of your ability based on any sense you might have about your dreams. Leave blank those questions that you feel you simply cannot answer.

1. How many dreams do you typically remember in a week?
   A. 0
   B. 1-2
   C. 3-6
   D. 7 or more

2. Do you ever experience dreams in which you are aware that you are dreaming while you are dreaming?
   A. Yes, often (one or more times a week)
   B. Yes, on occasion (1-3 times a month)
   C. Rarely (less than five times a year)
   D. Never

3. Some people have dreams in which they encounter strange and unusual beings, reminiscent of mythology and/or fairy tales. These are archetypal dreams. Do you ever have such dreams?
   A. Yes, often
   B. Yes, on occasion
   C. Yes, rarely
   D. Never

4. Do you ever have nightmares?
   A. Yes, (1+ a week)
   B. Yes, (1-3 a month)
   C. Yes, (less than five/year)
   D. Never

5. How often in your dreams do you feel:
(4=often, 3=on occasion, 2=rarely, 1=never)
   __ Happiness
   __ Sadness
   __ Confusion
   __ Anger
   __ Tranquility

__ Apprehension (guilt, anxiety)
__ No emotion

6. Some people have aggressive dreams in which verbal or physical fighting occurs. Do you have dreams in which fighting takes place?
A. Yes, often
B. Yes, on occasion
C. Rarely
D. Never

7. How often do your aggressive dreams involve non-physical aggression?
A. Often
B. On occasion
C. Rarely
D. Never

8. How often do your aggressive dreams involve physical aggression?
A. Often
B. On occasion
C. Rarely
D. Never

9. When there is non-physical aggression in your dreams, how often are you the aggressor (versus the one aggressed)?
A. Often
B. On occasion
C. Rarely
D. Never

10. When there is non-physical aggression in your dreams, how often are you the recipient of the aggression?
A. Often
B. On occasion
C. Rarely
D. Never

11. When there is physical aggression in your dreams, how often are you the aggressor?
A. Often
B. On occasion
C. Rarely
D. Never

12. When there is physical aggression in your dreams, how often are you the

recipient of the aggression?

A. Often
B. On occasion
C. Rarely
D. Never

13. In your aggressive dreams, how often is the aggression directed: (4=often, 3=on occasion, 2=rarely, 1=never)

__ toward men
__ from men
__ toward women
__ from women
__ toward yourself
__ from yourself

14. In your aggressive dreams, how often are you:
(4=often, 3=on occasion, 2=rarely, 1=never)

__ Witnessing the violence or aggression
__ Participating in the violence or aggression

15. How often do you have friendly interactions in your dreams?

A. Often
B. On occasion
C. Rarely
D. Never

16. How often do you initiate friendly interactions in your dreams?

A. Often
B. On occasion
C. Rarely
D. Never

17. How often do you hug people in your dreams?

A. Often
B. On occasion
C. Rarely
D. Never

18. How often are the characters in your dreams familiar to you?

A. Often
B. On occasion
C. Rarely
D. Never

19. How often are the characters in your dreams:
(4=often, 3=on occasion, 2=rarely, 1=never)
__ Men
__ Women

20. How would you describe the interactions with the characters in your dreams:
(4=often, 3=on occasion, 2=rarely, 1=never)
__ Friendly
__ Unfriendly

21. How often is the interaction in your dreams:
(4=often, 3=on occasion, 2=rarely, 1=never)
__ Aggressive
__ Friendly
__ Sexual

22. How often in your dreams do you experience:
(4=often, 3=on occasion, 2=rarely, 1=never)
__ Good fortune
__ Misfortune

23. In your dreams, how often are you:
(4=often, 3=on occasion, 2=rarely, 1=never)
__ With many people
__ With a few people
__ With one other person
__ Alone

24. Do you ever have dreams in which you are not the central character?
A. Yes, often
B. Yes, on occasion
C. Rarely
D. Never

25. How often do you have dreams in which there are sudden or abrupt changes in scene for no apparent reason?
A. Often
B. On occasion
C. Rarely
D. Never

26. How often do your dream take place:
(4=often, 3=on occasion, 2=rarely, 1=never)
__ Indoors in a familiar setting

__ Indoors in an unfamiliar setting
__ Outdoors in a familiar setting
__ Outdoors in an unfamiliar setting

27. How often do the following occur in your dreams?
(4=often, 3=on occasion, 2=rarely, 1=never)
_ You have difficulty walking, talking or thinking, and/or feel generally confused.
__ You make decisions that, upon awakening, seem illogical

28. How often do the following occur in your dreams?
(4=often, 3=on occasion, 2=rarely, 1=never)
_ You see or hear things that in waking life are relatively improbable or unlikely
__ The characters are combinations of two or more people
_ You see or hear things that in the real world are utterly physically impossible

29. How often do the following occur in your dreams?
(4=often, 3=on occasion, 2=rarely, 1=never)
__ Characters or objects change in size, shape or form
__ You see complex geometric shapes or patterns
_You experience your body as changing in size, shape or position (including flying, falling, or viewing yourself from outside your body)
_You find yourself in a world or setting that could not exist in waking (i.e. other planets, other historical times)
__ You experience powerful emotions of awe, mystery or total amazement
_ you encounter strange beings of a mythological or fantastic nature (e.g. ghosts or gnomes).
__ Either your identity or that of somebody else changes

30. Do you look forward to your dreams?
(4=a lot, 3=somewhat, 2=a little, 1=not at all)
__ Yes
__ No

Appendix 2 Abbreviated Tellegen Absorption Measure

Please answer the following to the best of your ability.

1. Sometimes I feel and experience things like I did when I was a child. T___ F___
2. My table manners are not always perfect. T___ F___
3. I am just naturally cheerful. T___ F___
4. I can be greatly moved by eloquent or poetic language. T___ F___
5. I could be happy living by myself in a cabin in the woods or mountains. T___ F___
6. While watching a movie, a T.V. show, or a play, I may become so involved that I forget about myself and my surrounding and experience the story as if it were real and I were taking part in it. T___ F___
7. I enjoy being in the spotlight. T___ F___
8. If I stare at a picture and then look away from it, I can sometimes "see" an image of the picture, almost as if I were still looking at it. T___ F___
9. I perform in public whenever possible. T___ F___
10. Sometimes I feel as if my mind could envelop the whole world. T___ F___
11. I suffer from nervousness. T___ F___
12. I like to watch cloud shapes change in the sky. T___ F___
13. I like to stop and think things over before I do them. T___ F___
14. If I wish, I can imagine (or daydream) some things so vividly that they hold my attention as a good movie or story does. T___ F___
15. I often monopolize conversations. T___ F___
16. I really think I know what some people mean when they talk about mystical experiences. T___ F___
17. Everyday I do some things that are fun. T___ F___
18. I sometimes "step outside" my usual self and experience an entirely different state of being. T___ F___

19. I can sometimes recollect certain past experiences in my life with such clarity and vividness that it is like living them again or almost so. T___ F___
20. I would not enjoy being a politician. T___ F___
21. When I get angry I often am ready to hit someone. T___ F___
22. Textures--such as wool, sand, wood--sometimes remind me of colours or music. T___ F___
23. My opinions are always completely reasonable. T___ F___
24. I am able to wander off into my own thoughts while doing a routine task and actually forget that I am doing the task, and then find a few minutes later that I have completed it. T___ F___
25. I have at times eaten too much. T___ F___
26. Sometimes I experience things as if they were doubly real. T___ F___
27. My mood often goes up and down. T___ F___
28. When I listen to music I can get so caught up in it that I don't notice anything else. T___ F___
29. I seem to have a natural talent for influencing people. T___ F___
30. If I wish, I can imagine my body to be so heavy that I could not move it if I wanted to. T___ F___
31. I am more of a "loner" than most people. T___ F___
32. I can often somehow sense the presence of another person before I actually see or hear him/her. T___ F___
33. When I need something at the store, I usually get it without thinking about what else I may need soon. T___ F___
34. The crackle and flames of a wood fire stimulates my imagination. T___ F___
35. It is sometimes possible for me to be completely immersed in nature or in art and to feel as if my whole state of consciousness has somehow been temporarily altered. T___ F___
36. Sometimes I'm a bit lazy. T___ F___
37. Different colours have distinctive and special meanings for me. T___ F___
38. I often feel fed-up. T___ F___

39. Things that seem meaningless to others often make sense to me. T___ F___

40. While acting in a play, I think I could really feel the emotions of the character and "become" him/her for the time being, forgetting both myself and the audience. T___ F___

41. My thoughts often don't occur as words but as visual images. T___ F___

42. I am a better talker than listener. T___ F___

43. I often take delight in small things (like the five-pointed star shape that appears when you cut across the core of an apple or the colours in soap bubbles). T___ F___

44. I would not like to try sky diving. T___ F___

45. When listening to organ music or other powerful music, I sometimes feel as if I am being lifted in the air. T___ F___

46. I push myself to the limits. T___ F___

47. Sometimes I can change noise into music by the way I listen to it. T___ F___

48. At times I have been envious of someone. T___ F___

49. I would not hurt others to get what I want. T___ F___

50. Some of my most vivid memories are called up by scents and smells. T___ F___

51. Certain pieces of music remind me of pictures or moving patterns of colour. T___ F___

52. I often know what someone is going to say before he or she says it. T___ F___

53. I have often been lied to. T___ F___

54. For me, life is a great adventure. T___ F___

55. I could pull up my roots, leave home, my parents, and my friends, without suffering great regrets. T___ F___

56. The sound of a voice can be so fascinating to me that I can just go on listening to it. T___ F___

57. People consider me a rather freewheeling and spontaneous person. T___ F___

58.	I often have "physical memories"; for example, after I've been swimming I may still feel as if I am in the water.	T___	F___
59.	I like the kind of work that requires my close attention.	T___	F___
60.	I would describe myself as a tense person.	T___	F___
61.	There are days when I am "on edge" all the time.	T___	F___
62.	At times I feel the presence of someone who is actually not there physically.	T___	F___
63.	Sometimes thoughts and images come to me without the slightest effort on my part.	T___	F___
64.	I find it very easy to enjoy life.	T___	F___
65.	I find that different odours have different colours.	T___	F___
66.	I can be deeply moved by a sunset.	T___	F___

Appendix 3 Scoring Manual for Dream Diaries

Emotions-- scored according to Hall and Van De Castle criteria, with the addition of Tranquility, which is scored after any mention of feeling serene, peaceful or calm.

Aggression-- the following all scored as aggression: aggressive act resulting in the death of a character; aggressive act which involves an attempt or threat to physically harm a character. The attempt or threat may be carried out through personal assault or through use of a weapon; aggressive act involving serious accusation or verbal threat of harm; aggression displayed through verbal or expressive activity (e.g., yelling, swearing, scowling at another character).

Aggressor or Victim of Aggression-- dreamer either aggresses against or is victim of aggression from another character.

Aggression from or toward Men or Women-- whom the aggression is directed toward, and if dreamer not aggressor, gender of aggressor.

Friendly Interactions-- the following all scored as friendly interactions: friendliness expressed through a desire for long-term close relationship with a character (e.g., getting married, engaged, falling in love); friendliness expressed through socially acceptable forms of physical contact (e.g., kissing, hugging, shaking hands, dancing); friendliness expressed through taking initiative in requesting character to share in a pleasant social activity; friendliness expressed through extending assistance to a character or offering to do so; friendliness expressed by offering a gift or loaning a possession to another; friendliness conveyed through verbal or gestural means (e.g., welcoming, greeting, waving hello, introducing people, smiling).

Initiating Friendly Interaction-- dreamer befriends another character by initiating interaction.

Hug-- any mention of dreamer hugging another human character.

Sexual Interactions-- non-platonic kissing or embracing up to sexual intercourse.

Characters-- human, described as physically present; characters heard or seen but not physically present.

Number of Characters-- 0 = dreamer alone; 1 = 1 other character; 2 = 2 other characters; 3 = more than 2 characters including dreamer.

Gender of Characters-- If many characters (e.g., group, crowd), score majority as male or female.

Female Characters-- 0 = no female characters; 1 = 1 female character not including dreamer; 2 = 2 female characters not including dreamer; 3 = 3 or more female characters not including dreamer.

Male Characters-- same scoring as for female characters.

Indefinite Sex-- 0 = 0; 1 = 1 character unspecified gender (e.g., "Someone ran by me"); 2 = 2 characters unspecified gender; 3 = 3 or more characters unspecified gender.

Dreamer Not In Dream-- yes, no.

Misfortune-- character dead or dies as a result of accident or illness or some unknown cause; character injured or ill; character involved in accident without suffering physical or mental injury; character loses a possession or has one damaged or destroyed; character encounters environmental barrier or obstacle; character unable to move; character lost.
Good Fortune-- acquisition of goods or something beneficial happens to character adventitiously; character becomes "lucky".

Settings-- indoor, outdoor, familiar, unfamiliar all scored according to Hall and Van De Castle criteria; distorted setting scored as unfamiliar.

Lucidity-- any mention by dreamer that s/he is aware s/he is dreaming while dreaming; scored yes or no.

Exam-- any mention of exam or test; (note: mention of school alone does not constitute mention of exam).